National Mathematics Advisory Panel: Major Topics of School Algebra

Professional Development Lesson

Topics of Algebra

Classroom Connections are items or activities that can be immediately implemented in classrooms and are noted by CC*

Related Resources	Bradley Witzel (32 video clips) Instructional Innovations Unit Website Doing What Works Website
Materials Needed	Pencils, small groups, chart paper

Step	*Description*	*Time*	*Target Audience (All, Educational leaders, teachers)*
Introduction	Use slide #1-3 which includes an icebreaker activity (use if appropriate for your group)	5 min.	All
Visual Diagram	Slide #4	1 min.	All
Multimedia Overview: National Mathematics Advisory Panel	Slide #5: Use the video to introduce Major Topics of School Algebra	3:25 min.	All
Multimedia Overview: School Algebra Topics	Slide #6: Use this multimedia overview to learn about the recommended algebra topics, the importance of making connections across topics, and helping students learn algebra.	7:08 min.	All
Compare	Slide #6: Use Handout #1 (MT standards) In small groups compare MT standards with the major topics NMP recommends.	5 min.	All
Share	Slide #6: Where are these recommendations taught?	1-2 min.	All
Think-Pair-Share	Slide # 7: What are barriers teachers have for teaching algebra?	1-2 min.	Teachers

Video: Dr. Wu "What Algebra Teachers Need to Know"	Slide # 7: Listen to Dr. Wu talk about the importance of helping teachers develop a deep understanding of their subject matter and the need to focus instruction on the most critical aspects of algebra and emphasize the connections among topics.	5:46 min.	Teachers
Review and discuss	Review Slides #8-10: Key Concepts	3-5 min.	All
Small group discussion	Slide #11: Using Handout #2: *Algebra 1 Initial Units* ask what do you notice about the essential questions from this sample? How do they compare to the level of questions you ask your students? How do you currently organize your units of study?	5-7 min.	Teachers
Audio clip: Expert Interview: District Perspective on Algebra	Slide #12: The district mathematics coordinator describes the process of establishing essential algebra standards and aligning expectations with end-of-course and interim assessments. Ask participants to take write down any ideas they want to remember from this audio clip.	5:47 min.	All
Share	Slide #12: Quickly ask participants to share what they wrote down.	1-3 min.	All
Preview and Discuss	Slide #12: Preview and consider the use of Handout #3: *Topics of Algebra Review*. Allow staff time to preview and small group discussion.	6-8 min.	Teachers
Share	Slide #12: Ask: How can Handout #3 be used?	2-3 min.	Teachers

Think-Pair-Share	Slide #12: Have participants scan handout #4: *Learning From Algebra Teaching Peers*, to understand how algebra teachers can use this observation tool to learn from other teachers and determine which practices might be adaptable to their own teaching. Discuss with your right shoulder partner how this tool could be used in your district. What are some pros to using a tool like this? What might be some barriers to the use of this type of tool? How might you implement this tool?	10-15 min.	Teachers
Discuss	CC* Assignment: Simplifying Expressions is a Classroom Connection that teachers can implement immediately into their classrooms. It includes a lesson plan, problem worksheet, and homework practice problems on simplifying expressions. Included are strategies for struggling students.	3-4 min.	Teachers
Multiple Paths			
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Materials Needed	Pencils, small groups, chart paper		
Step	*Description*	*Time*	*Target Audience (All, Educational leaders, teachers)*
Multimedia Overview: Multiple Pathways to School Algebra	Slide #13: Watch this multimedia overview to learn more about the importance of expectations that all students will learn algebra and the various curricular approaches that enable teachers to respond flexibly to a range of student levels and abilities.	7:17 min.	All

Explain	Slide #14: Read slide that summarizes that multiple paths of learning algebra will allow all students to learn algebra	1-2 min.	All
Review and Discuss	Slides #15-17: Key Concepts	3-5 min.	All
Think-Pair-Share	Slide #18: Think of barriers for students to learn algebra, pair, and share. Write shared comments on chart paper.	2-3 min.	All
Video: Instructional strategies for struggling Algebra Students	Slide #18: Dr. Grossen tells about practical ideas for working with students who are struggling with algebra, focusing on weaving together instruction in preparatory skills along with algebra concepts. Have participants write down strategies Dr. Grossen refers to on a sheet of paper.	6:41 min.	Teachers
Presentation: Helping Struggling Learners in Algebra	Slide #19: Hear ideas from teacher, Sally Collins, for overcoming students' lack of preparation for algebra.	6:19 min.	Teachers
Discuss	Slides #20-22: Discuss the questions from these three slides.	15-20 min.	Teachers
Review	Slide #23: Handout #5: *Algebra Pathways Inventory: Working with Struggling Algebra Students*.	3-4 min.	Teachers
Discuss in small groups	Slide #23: Handout #5 Ask: How can you use this inventory? (If your purposes are to build an inventory at this PD session have participants list or highlight items on the inventory they want included in their school's/district's inventory.)	10-15 min.	Educational Leaders
Share	Slide #23: Share out regarding handout #5	5-7 min.	Educational Leaders
Discuss	CC* Linear Mingle is a Classroom Connection that teachers can immediately implement into their classrooms. The activity is a flashcard matching activity to help students build fluency with algebraic vocabulary, concepts, and symbols.	2-3 min.	Teachers
Discuss	CC* Linear Graph Back to Back is a Classroom Connection that teachers can immediately implement into their classrooms. This is an activity to help students	2-3 min.	Teachers

	develop their communication skills with algebra vocabulary. In pairs, students take turns orally describing a graph while the other draws the graph.		